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Effect of a multidisciplinary program for the prevention of low back pain in hospital employees: A randomized controlled trial

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Abstract.

BACKGROUND: Hospital workers with physically demanding jobs are at risk for developing recurrent LBP. There is a lack of studies evaluating multidisciplinary prevention of low back pain (LBP) in hospital workers

OBJECTIVE: This randomized controlled trial evaluates the effect of a multidisciplinary prevention program, focusing on a client-centred approach, on hospital workers at risk for developing LBP.

METHODS: Caregiving hospital workers were allocated to an experimental (12-week lasting multidisciplinary prevention program) or control group (no intervention). They were evaluated prior to the intervention and after a 6 months follow-up period. Primary outcome measures included incidence of LBP, work absenteeism and general health. Secondary outcomes included daily physical activity, job satisfaction and coping strategies.

RESULTS: A significant improvement was seen for passive coping after 6 months follow-up, but no significant differences were observed between groups in primary or other secondary outcome measures ($p > 0.05$).

CONCLUSIONS: A multidisciplinary prevention program fitting into a bio-psychosocial context may not have been intensive enough to promote a change in daily habitudes, and had no effect on work absenteeism, incidence of LBP or general health. Further research should determine whether prevention of LBP is possible in caregiving personnel.

Keywords: Pain, therapy, primary prevention, occupational disability, behaviour, health promotion, health care sector

1. Introduction

Non-specific low back pain (LBP) is the most common musculoskeletal disorder, affecting 70–85% of all adults at some point in their life [1]. The course of LBP is characterized by a recurring pattern of complaints [2]. A large proportion of patients still expe-

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rience LBP at 12 months follow-up [3], accounting for major expenses in health care and disability systems [1]. The medical and non-medical costs due to LBP remain a large socio-economic burden for the industrialized world.

Especially nurses and hospital workers involved in physical demanding jobs are at risk for developing recurrent LBP [4–9]. The annual incidence rate of LBP in nurses varies between 40 and 58% [10–12], and the life time incidence between 35 and 80% [5,12]. Nurses with LBP believe that their pain is caused at the workplace [13]. Several studies indeed observed a relationship between increased job demand and musculoskeletal disorders, including LBP and neck pain, in nurses [14,15]. Both the physical demand of the job and work pressure seem to be important in nurses [16]. One study evaluating the exposure to possible risk factors in 12426 participants from 47 occupational groups (mostly nurses and office workers) confirmed that occupational physical activities and psychosocial aspects of work are risk factors for developing LBP [17].

The daily experience of LBP at work may have severe consequences, such as decreased quality of life, burn out or work absenteeism. Unsurprisingly, several studies demonstrated an association between work-related LBP, negative beliefs, reduced job satisfaction and burn out or days off work in nurses [15,18]. The high incidence and prevalence of LBP among nurses and caregiving hospital employees and the subsequent socio economic burden justify the search for primary prevention programs in this population.

Several systematic reviews have been undertaken to evaluate the effectiveness of prevention programs since the publication of the European guidelines for the prevention of work-related LBP, in which the use of multidisciplinary interventions is recommended [19]. A systematic review regarding the effectiveness of high quality controlled interventions to prevent LBP in working age adults revealed that preventive programs including exercise interventions were effective for preventing self-reported LBP in seven out of eight trials [20]. Four of these trials were conducted in nurses or hospital workers with a previous experience of LBP. Other interventions (education, lumbar support, ergonomics and stress management) do not appear to be effective in the reduction of LBP incidence, but these conclusions were made on a very few number of studies [20]. Two other systematic reviews examining prevention of LBP confirmed the lack of effectiveness of educational interventions focussing on a biomechanical/biomedical model [21] and interventions using lifting equipment [22].

Finally, a fourth systematic review evaluated the effect of interventions to prevent LBP in nurses and revealed that isolated interventions, such as manual handling training or stress management as the sole treatment option, are ineffective. The authors of this review highlighted the need for multimodal interventions to prevent LBP and back injuries in nurses [23]. However, there is a lack of studies evaluating multidisciplinary preventive modalities in nurses and hospital workers at risk to develop LBP, despite the recommendations of the European guidelines in 2005 to use multidisciplinary interventions in the prevention of work-related LBP [19].

Zinzen et al. evaluated risk factors associated with LBP in 1783 nurses and performed a factor analysis and discriminant analysis, for developing a multidisciplinary prevention model [4]. They failed to extract factors and found several variables with a high discriminating power, suggesting that LBP is related to a wide range of variables. Fear avoidance beliefs of work and physical activity were the strongest discriminating variables in relation to LBP, followed by coping strategies. Posture, movements and musculoskeletal problems in other regions of the body were somewhat less prominent, as they could not explain the high prevalence of LBP [4].

Therefore, Zinzen et al. concluded that psychosocial variables, general health and ergonomics should be addressed in a primary multidisciplinary prevention program, in addition to a hospital policy approach [4]. The involvement of key stakeholders has indeed been recommended in the prevention and the management of LBP [24]. However, the efficacy of the theoretical prevention model proposed by Zinzen et al. has not yet been studied.

The aim of this study was to evaluate the effectiveness of a multidisciplinary prevention program for LBP, focusing on a client-centred approach, in healthy workers who are at risk for developing LBP. Primary outcome measures included work absenteeism, incidence of LBP and general health. Secondary outcomes included daily physical activity, job satisfaction and coping strategies.

2. Material and methods

2.1. Study design

A randomized controlled study was conducted to evaluate the effect of a multidisciplinary prevention

program in healthy hospital employees. All participants were asked to fill in several questionnaires prior to the intervention and at 6 months follow-up. The H° 2008/166). The study was conducted in accordance with the Declaration of Helsinki.

2.2. Subjects

Caregiving hospital employees in physically demanding jobs were recruited from two hospitals during 2 consecutive years. An information campaign took place in both hospitals to recruit healthy participants with an increased risk for the development of LBP at the start of the academic year. In order to prevent selection bias, the primary aim of the study, i.e. the preventive effect of the multidisciplinary program on the incidence of LBP, was omitted during the recruitment period to avoid an implicit negative attitude towards LBP (priming effect) [25]. Participants were told instead that the prevention program aimed at improving overall health. Intensive efforts were made to promote this study in both hospitals. Both men and women aged between eighteen and sixty-five years were included. Exclusion criteria were: (1) serious neurological, orthopaedic, cardiovascular or internal diseases, (2) overweight (body mass index [BMI] higher than 32 kg/m^2), (3) drug or alcohol abuse, (4) pregnancy and (5) more than four weeks of work absenteeism due to work-related physical complaints during the latest twelve months, as recommended by the funds for occupational diseases in our country[a]. Prior to participation, all subjects received verbal and written information addressing the study nature. Participants were asked to read the information leaflet carefully and to sign the informed consent form to indicate agreement to participate in the study. An a priori power analysis, based on the incidence of LBP in nurses [10–12], revealed that 60 subjects were needed in each group to detect differences between groups with a power of 0.80 and a significance level of 0.05.

2.3. Randomization and blinding

Simple randomization, with a 1:1 allocation ratio, was performed by means of lottery. Participants and assessors were not blinded for the intervention.

2.4. Intervention

Prior to the experimental intervention, a client-centred, multidisciplinary prevention program, based on the theoretical prevention model of Zinzen et al. was developed [4]. This theoretical prevention model reflects the biopsychosocial nature of LBP and consists of four components (Fig. 1): 1) intervention at hospital policy level, 2) general health (exercise and nutritional intervention), 3) ergonomics and 4) psychological intervention. The intervention at policy level occurred first, followed by exercise and nutritional intervention. Finally, the ergonomics took place. The psychological intervention was addressed throughout the entire program. The program lasted three months and consisted of ten group sessions of one hour and five individual sessions.

2.4.1. Hospital policy

Boards of participating hospitals were informed by the researchers about economic consequences provoked by work absenteeism due to LBP. They were asked to allow the study to be conducted during working hours of the participants, in order to facilitate the participation of caregiving hospital employees in this study. They were also asked to consider propositions from participants regarding changes to work conditions, as a result from the intervention. These changes included for example work schedules, (altered) use of equipment, methods of lifting, etc. Both hospitals gave their approval for the study.

2.4.2. General health of workers

Besides an effect on the incidence of LBP, this intervention aimed at promoting overall health, and therefore consisted of an exercise and diet component, which was spread out over a period of 6 weeks. Six sessions of 1 hour were organized and comprised a general movement session, a lunchtime walk, two sessions in which lumbo-pelvic motor control exercises were performed, a nutrition session and a cardiovascular training. Physiotherapists organized all movement sessions, a dietician provided the nutrition session.

2.4.3. Ergonomics

Six sessions, provided by occupational therapists, were spread out across six weeks. An assessment of the Canadian Occupational Performance Measure [26, 27] was performed during 2 individual sessions. Ergonomics were the focus of 4 group sessions. Seating and computer work, sleeping positions, postures at work and postural awareness at home were discussed during the sessions.

2.4.4. Psychosocial approach

A psychosocial intervention took place simultaneously with the other interventions, and consisted of three individual 1-hour sessions, provided by a physiotherapist with expertise in communication and behav-

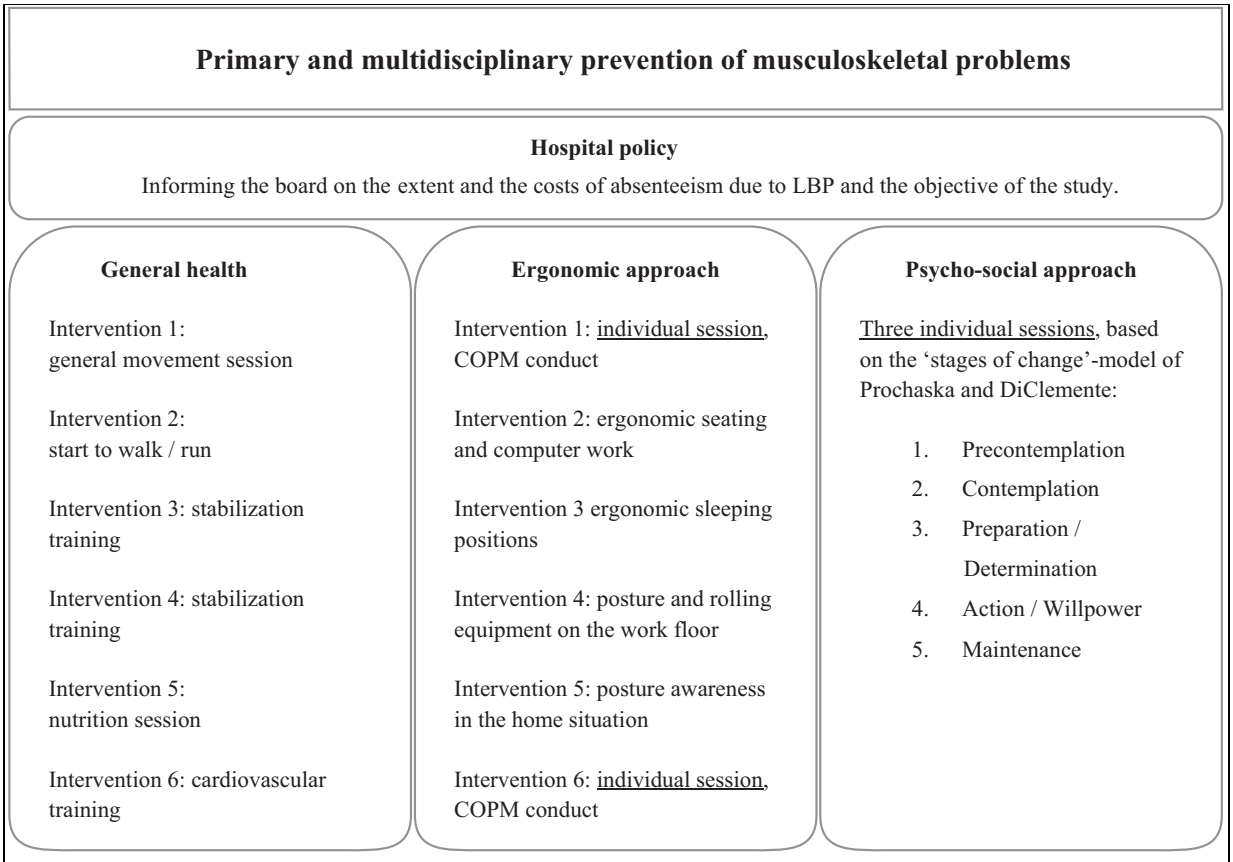

Fig. 1. Multidisciplinary prevention program based on Zinzen et al. [4].

iour change. This intervention is based on the 'stages of change'-model of Prochaska and DiClemente, in which different stages of behavioural change are described [28].

The participants allocated in the control group did not receive any intervention, but were tested at the same moments as the participants of the experimental group.

2.5. Outcome measures

Data collection took place at baseline and at six months follow-up, as we did not expect immediate changes following the intervention. Primary outcome measures included (1) incidence of LBP, (2) rate of work absenteeism and (3) general health. Secondary outcome measures included (1) physical activity, (2) job satisfaction and (3) coping strategies.

2.5.1. Incidence of LBP and work absenteeism

The prevalence and incidence of LBP/musculoskeletal symptoms, and the work absenteeism related to LBP/musculoskeletal symptoms, were determined with an adapted version of the Nordic Musculoskeletal Questionnaire (NMQ). The NMQ quantified musculoskeletal pain and related disability in 9 body regions that are visually depicted on a body chart [29], and has extensively been used in occupational populations, including nurses [30–32]. The clinimetric properties of the NMQ have been established [29]. The following questions were retrieved from this questionnaire for the baseline assessment: Have you had trouble today? Have you had trouble at any time during the last 12 months? During the last 12 months, have you at any time taken sick leave from work because of trouble? Trouble was defined as ache, pain or discomfort [29], and if the participants answered yes on one of these questionnaires, they were asked to indicate the anatomical region (neck, shoulder/arm, elbow/forearm, hand/wrist, upper back, lower back, hip/thigh, knee/lower leg and ankle/foot) on the body chart. At follow-up assessment, the incidence and work absenteeism were reported for the period during the study.

Table 1
Characteristics of participants

	Experimental group $N = 31$		Control group $N = 38$		
	Baseline (Mean)		Baseline (Mean)		P
Age (years)	41.4		40.4		0.680
Weight (kg)	71.9		68.8		0.328
Length (cm)	167.4		166.0		0.532
BMI (kg/m^2)	25.7		24.9		0.472
	Baseline N (%)	Follow-up N (%)	Baseline N (%)	Follow-up N (%)	P‡
Proportion of subjects with musculoskelal symptoms on the day the study took place	14/31 (45%)	8/25 (32%)	18/38 (47%)	14/25 (56%)	0.077
Proportion of subjects with musculoskelal symptoms during the past 12 months	6/31 (19%)	3/25 (12%)	7/38 (18%)	6/21 (29%)	0.328
Proportion of subjects with LBP on the day the study took place	6/31 (19%)	4/22 (18%)	9/38 (24%)	4/25 (16%)	0.500
Proportion of subjects with LBP during the past 12 months	1/31 (3%)	2/25 (8%)	1/38 (3%)	1/25 (4%)	0.500
Proportion of workers that suffered from work absenteeism because of LBP/musculoskeletal symptoms during the past 12 months	5/31 (16%)	2/25 (8%)	3/38 (8%)	3/25 (12%)	0.500

Legend: Descriptive data, prevalence and incidence of symptoms/LBP and work absenteeism are reported for experimental and control group. ‡Differences between groups at follow-up. Significance level p-value $\leqslant 0.05$.

General health was scored using the Dutch version of the 36-item Short Form Health Survey (SF-36), with the following items: physical functioning, social functioning, role limitations by physical problems, role limitations by emotional problems, mental health, energy, physical pain and general health. A higher score corresponds to better functionality. The clinimetric properties of the SF-36 questionnaire have been established [33,34].

Physical activity was determined using the Baecke Questionnaire, consisting of sixteen questions. Three indexes can be calculated: physical activity at work, during sports and during leisure. A higher score corresponds to increased physical activity. The Baecke questionnaire was found to be reliable and valid [35, 36]

Job satisfaction. The Psychosocial Aspects of Work (PAW) questionnaire examines job satisfaction, social support from colleagues and mental stress at work [37]. This questionnaire is based on the 7-item WORK Apgar reported by Bigos et al. The reliability of the questionnaire is good [37].

Coping Strategies. To determine how a person copes with problems or stressful events, the Utrecht Coping List (UCL) was used. Seven coping responses are evaluated (active approach, Palliative reaction, Avoidance, Search for social support, Passive reaction pattern, Expression of emotions, Reassuring thoughts). Each score is converted to a standard five-point scale ranging from 'very low' to 'very high'. The UCL is found to be reliable and valid [38,39].

2.6. Statistical methods

Statistical analysis was performed with SPSS version 18.0. Normality of the variables was tested with the Kolmogorov-Smirnov test. Comparison of the groups before the intervention was done with a Fisher's exact test and with the Independent-samples T-test. A two-way repeated measures analysis of variance (ANOVA) (group x time) was performed to identify the interventional effect over time considering a relationship between evaluations performed in a single individual. An intention-to-treat analysis with the "last observation carried forward method" was performed in cases of drop out. A Fisher's exact test was used to compare categorical data (incidence in LBP/work absenteeism) between experimental and control group. In addition, the incidence of LBP was compared between participants with and without LBP at baseline in each group. The significance level was set at 0.05.

3. Results

Sixty-nine workers (recruited among nurses, caregivers, physiotherapists and occupational therapists of both hospitals) volunteered for the study and were randomly assigned to the experimental ($N = 31$, 26 female subjects) or control group ($N = 38$, 31 female subjects). Descriptive data of the 2 groups are presented in Table 1. At baseline, no significant differences were observed between groups ($p > 0.05$).

Table 2
Results of the SF-36 in the experimental ($N = 31$) and control group ($N = 38$)

Item	Group	Baseline X (SD)	Follow-up X (SD)	Factor Time p-value	Interaction time * group p-value
Physical functioning	Experimental	79.84 (18.37)	82.23 (16.91)	0.114	0.561
	Control	76.58 (18.05)	78.16 (17.65)		
Role physical	Experimental	91.13 (24.62)	88.71 (25.69)	0.445	0.854
	Control	84.21 (32.06)	80.26 (33.47)		
Physical pain	Experimental	79.42 (23.48)	79.39 (23.49)	0.423	0.434
	Control	68.39 (23.48)	65.76 (24.62)		
General health	Experimental	69.19 (19.22)	70.42 (19.01)	0.376	0.811
	Control	63.87 (19.49)	66.00 (22.68)		
Vitality	Experimental	70.00 (16.68)	70.81 (13.91)	0.292	0.588
	Control	64.08 (18.38)	66.58 (19.14)		
Social functioning	Experimental	85.48 (24.81)	87.50 (22.13)	0.872	0.445
	Control	83.22 (21.61)	81.91 (24.78)		
Role emotional	Experimental	90.33 (23.08)	91.40 (27.17)	0.340	0.211
	Control	85.96 (30.64)	78.07 (37.39)		
Mental health	Experimental	75.61 (17.87)	76.65 (17.83)	0.637	0.243
	Control	75.89 (15.21)	73.47 (17.66)		

Significance level *p-value $\leqslant 0.05$.

Table 3
Results of the Baecke Questionnaire

Item	Group	N	Baseline X (SD)	Follow-up X (SD)	Factor time	FactorTime * Group
Work Index	Experimental	31	3.07 (0.28)	2.93 (0.273)	0.001*	0.129
	Control	38	3.16 (0.32)	2.92 (0.313)		
Sport Index	Experimental	31	2.81 (0.49)	2.79 (0.57)	0.223	0.147
	Control	38	2.77 (0.55)	2.95 (0.57)		
Leisure Index	Experimental	31	3.24 (1.37)	3.12 (0.84)	0.668	0.551
	Control	38	2.84 (0.68)	2.86 (0.60)		
Total Score	Experimental	31	9.13 (1.51)	8.85 (1.34)	0.216	0.632
	Control	38	8.78 (0.95)	8.65 (1.01)		

Significance level *p-value < 0.05.

3.1. Incidence of LBP and absenteeism

Data regarding the prevalence and incidence of LBP or musculoskeletal symptoms and rate of work absenteeism are presented in Table 1. No significant differences were observed between intervention and control group at follow-up assessment ($p > 0.05$). The incidence in LBP or the work absenteeism during the study did not differ between participants with and without LBP at baseline (data not shown).

3.2. General health

The results of the sub-scores of SF-36 are detailed in Table 2. No significant differences were observed between groups ($p > 0.05$).

3.3. Physical activity

The results of the Baecke questionnaire are presented in Table 3. For the subscale Work index, a significant time effect was demonstrated, but no between groups differences were observed ($p > 0.05$), implying that a similar evolution occurred in both groups.

3.4. Job satisfaction

Results regarding job satisfaction are shown in Table 4. No significant differences were observed between groups after follow-up ($p > 0.05$).

3.5. Coping

Table 5 presents the findings of the UCL. The score on the passive reaction pattern – as it represents com-

Table 4
Results of the PAW Questionnaire

Item	Group	N	Baseline X (SD)	Follow up X (SD)	Factor time p-value	Interaction time * group p-value
Job satisfaction	Experimental	30	26.1 (3.70)	26.9 (4.78)	0.285	0.092
	Control	38	26.0 (5.26)	25.8 (5.22)		
Social Support	Experimental	31	15.3 (2.80)	15.5 (2.53)	0.934	0.626
	Control	37	15.1 (3.02)	14.9 (3.16)		
Mental Stress	Experimental	31	15.7 (3.81)	15.2 (4.30)	0.182	0.825
	Control	37	15.2 (3.32)	14.9 (3.55)		

Significance level * p-value < 0.05.

Table 5
Results of the UCL Questionnaire

Item	Group	N	Baseline X (SD)	Follow up X (SD)	Factor time p-value	Interaction time * group p-value
Active approach	Experimental	30	19.07 (2.75)	18.60 (2.31)	0.395	0.132
	Control	38	18.53 (4.58)	18.66 (4.53)		
Palliative reaction	Experimental	30	17.67 (2.72)	17.33 (3.58)	0.105	0.613
	Control	38	16.95 (3.70)	16.32 (3.43)		
Avoidance	Experimental	30	15.90 (3.40)	15.57 (3.57)	0.081	0.759
	Control	38	14.95 (3.41)	14.47 (3.72)		
Search for social support	Experimental	30	14.93 (3.60)	14.73 (3.72)	0.270	0.880
	Control	38	15.16 (3.64)	14.89 (3.44)		
Passive reaction pattern	Experimental	30	11.83 (3.08)	10.83 (2.34)	0.001*	0.410
	Control	38	11.76 (3.34)	11.11 (3.26)		
Expression of emotions	Experimental	30	6.60 (1.28)	6.73 (1.39)	0.659	0.180
	Control	37	6.55 (1.54)	6.29 (1.68)		
Reassuring thoughts	Intervention	30	13.50 (2.24)	13.40 (2.39)	0.391	0.759
	Control	37	12.74 (2.95)	12.53 (2.85)		

Significance level *p-value < 0.05.

plete isolation from others – improved significantly during the follow-up measurement for both groups. However no significant differences were observed between groups ($p > 0.05$).

4. Discussion

The multifactorial aetiology of LBP suggests that multidisciplinary prevention programs should be recommended above mono-disciplinary programs [4,30, 40]. Mono-disciplinary intervention strategies have been found ineffective in nurses [23,41] or in other workers in physically demanding jobs, which are at risk for developing LBP [30]. Several authors therefore suggest that researchers should develop new and innovative approaches together with existing strategies to reduce or prevent LBP in the workplace [23,42] and tailor the programme to the risk profile of the individual or the workplace [40,43].

The present study extends previous research performed in hospital employers in which risk factors associated with LBP were identified (i.e. psychosocial factors, health variables, ergonomics and variables related to hospital policy) [4]. The purpose of the present study was to determine whether a multidisciplinary prevention program influences incidence of LBP, work absenteeism or general health in hospital employees which are at increased risk for developing LBP. In addition, the effect of this intervention program on physical activity, job satisfaction and coping was assessed. The results suggest that a 12-week multidisciplinary prevention program has no effect compared to a control group receiving no intervention at six months follow-up.

4.1. Influence of the intervention on the incidence of LBP, absenteeism and general health

The results of the present study do not support the hypothesis that a 12-week multidisciplinary program is effective in the prevention of LBP or to avoid work absenteeism due to LBP. According to the results ob-

tained from the SF-36 questionnaire, we could neither demonstrate an impact of the intervention on general health.

It is unclear why no effect was found in our study. We expected that the multidisciplinary design would have contribute to positive results, as early multifactorial intervention programs including both exercises interventions and educational/behavioural interventions held promising results [44]. Differences in methodology may account for the observed differences with the literature and may explain the lack of results in the present study. First, several studies with positive results included in the systematic reviews were performed in participants with a history of LBP only (e.g. at least one episode of sick leave for LBP during the past 2 years). In the present study, both participants with and without a history of LBP were included. Only 25% of the participants experienced LBP on the day the study took place or during the previous year, which is remarkably less that the prevalence and incidences of LBP in nurses reported in the literature [10–12]. It may be that this type of preventive intervention best fit to participants with LBP (secondary prevention) and not in the participants without LBP. This is in accordance to IJzelenberg et al, who observed no effect of a bio-psychosocially driven back pain prevention program in 489 workers (with and without a history of LBP) in physically demanding jobs [30]. Second, it is remarkable that most studies with positive results were performed more than 15 years ago [44,45], while recent studies report a lack of effect of multidisciplinary preventive programs. Third, despite the fact that several studies (including exercises) found some positive effects, effect sizes between intervention and control groups are very small [46]. Finally, the relative short period of follow-up may not have been long enough to detect differences between groups.

4.2. Influence of the intervention on physical activity, job satistfaction and coping strategies

No significant group effect was seen on *daily physical activity*, as measured by the Baecke Questionnaire, in the present study. Despite the information only given to the participants in the experimental group regarding the importance of physical activity and the different intervention sessions in which physical activity was promoted and exercised (lunch walk, etc.), this intervention does not seem to be effective. As the intervention was given in the workplace, it can however not be excluded that participants of the experimental intervention discussed the content of the intervention with the participants of the control group (i.e. contamination).

By means of the UCL, *coping strategies* were assessed, and again, no differences between groups are observed. Using a cross sectional design, Dawson et al. (2011) demonstrated that passive coping strategies were associated with an increased likelihood for being on sick leave because of LBP [47]. Passive coping decreased in both groups during the follow-up period in the present study, but the experimental intervention seemed not effective, as the results of the control group did not differ from the experimental group.

Comparison with other studies performed in hospital employees is difficult, as most studies did not take these outcome parameters into account. Several hypotheses may nevertheless explain the lack of significant results. It is a very complex and long lasting process to obtain a change in behaviour. Our 12 weeks lasting intervention may not have been intensive enough to promote a change in daily habitudes in participants following the experimental intervention. The multifactorial cause of LBP should be taken in mind. Secondly, recent research has underscored the importance of evaluating and treating the patient's perceptions and beliefs about his/her medical problem prior to the intervention [48,49]. It has been demonstrated in a large prospective cohort study that the perceptions that the problem will last long, weak beliefs about self-control and low confidence in the ability to perform activities despite the pain, were even better predictors of disability at 6 months than fear avoidance, catastrophizing or depression [48,50]. This is line with all the literature suggesting that the importance of psychosocial factors has been underestimated.

Finally, *job satisfaction* neither improved following the intervention. One of the purposes of this multidisciplinary prevention program is also to promote direct changes in work circumstances in order to improve job satisfaction. For that reason, the hospital board had been informed that participants may suggest – following the experimental intervention – some changes in the performance of their jobs, in order to facilitate the job. Hospital board was asked to do as much as possible to consider the propositions made by the employees. We have not checked with the hospital board whether propositions have been made and/or whether the board has accepted them. A negative reaction from the superior hierarchy may have contributed to the lack of changes in job satisfaction.

4.3. Limitations of the study

Results of this study should be seen in the light of some methodological limitations. Firstly, the study is

underpowered. Despite intensive efforts in both hospitals, only 69 participants volunteered for the study. Several subjects mentioned that a high workload was the reason they decided not to participate. Second, both participants with and without a history of LBP were included. Third, there was a high number of dropouts. Only 74% of the participants were enrolled in the follow-up measurements. To account for this, missing data were handled using intent-to-treat analysis. Fourth, the examiners were not blinded to the intervention. The outcome measures consisted of self-reported measures of the patients, but we cannot exclude that the lack of blinding may have played a role. Fifth, a longer period of follow-up may be necessary to detect differences between groups. Finally, the multidimensional nature of LBP complicates research focussing on the prevention of LBP. Our multidisciplinary prevention program included decisive and receptive factors for developing LBP, but we cannot exclude that other factors have played a role. For example, fear-avoidance beliefs and pain catastrophizing are primary psychosocial factors in the development and maintenance of LBP. Preliminary evidence suggest that interventions addressing beliefs and attitudes should be the priority in the treatment of subjects with LBP. Information oriented toward promoting activity and improving coping may promote a positive shift in beliefs. However this evidence is still insufficient to recommend for or against psychosocial information delivered at the worksite.

4.4. Recommendations for further research

Although the effectiveness and benefits of this multidisciplinary primary prevention program could not be demonstrated, more research in this area remains important. Many studies in the literature are limited to prevention strategies in a unidisciplinary setting. This study includes an innovative design and shows that there is a need for research in a multidisciplinary and primary prevention setting. Further research of high methodological quality is needed to evaluate whether prevention of LBP in caregiving personnel is beneficial.

5. Conclusion

The main purpose of this study was to evaluate the effect of a multidisciplinary prevention program for LBP, focusing on a client-centred approach, on healthy workers that are at risk for developing LBP. Based on these results, it cannot be concluded that this 12-week multidisciplinary prevention program influences the rate of absenteeism, incidence of LBP, or general health. Although the effectiveness and benefits of a multidisciplinary primary prevention program could not be demonstrated, more research on this subject remains important.

Appendix

[a]http://www.fmp-fbz.fgov.be/web/content.php?lang=nl&target=workers#/prevention-back-prevention.

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